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ABSTRACT

This is one of a series of proxemic studies of dyadic communication behavior made by the authors in natural, academic and laboratory settings with the use of the DIAD. Based on the theory of anthropologists Hall (1966) and Birdwhistell (1970) and developed empirically as initial observations of dyadic interaction were made, the Dennis Infracommunication Analysis Device DIAD (Dennis, 1971) is shown to produce interpretable data. Justification for this sort of instrumentation is presented along with the hypothesis that pupils interacting across race with other pupils and their instructors tend to space themselves at a greater interpersonal distance at the junior high age level than at the intermediate or primary age levels. Ss were two hundred pupils at primary, intermediate, and junior high levels observed interacting in 910 dyads wuth each other and their teachers in an unstructured summer school setting. Data support the hypothesis (p .05) for pupil to pupil communication. (Author)

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The present investigation examines interpersonal spatial distance and other nonverbal communication evidenced in dyads composed of Black and white boys and girls interacting with each other and their teachers in natural academic settings. The focus of the study is on observation, classification, recording and analysis of dyadic interaction of Ss, giving objective description of communication behavior. Legitimacy, interpretation, practicality, and some preliminary results are discussed.

It is generally recognized that human communication takes place in many ways, including visual, audible, and tactual. In addition to verbal communication, there are nonverbal means by which people convey meaning, consciously or unconsciously, ranging from use of time and space to gaze, position, gesture, facial expression, nonlinguistic aspects of sounds emitted, and physical contact (Birdwhistell, 1970; Hall, 1966; Scheflen, 1964).

Birdwhistell, who developed kinesics, the science of communication through body movement, holds that information is conveyed by a person in a number of different ways simultaneously. Messages may be sent in audible, visual, kinesic, or other modes by a person at any given time. Transmissions along these infracommunication channels may be concurrent, intermittent, or overlapping. A message on any one of the infracommunication channels may reinforce, cancel, or modify the transmissions on other communication channels. The complete message is made up of all the concomitant transmissions received along the infracommunication channels.

Use of word, space, gesture, and other communication modes is culturally patterned. Moreover, a specific communicative act or behavior may vary in

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meaning with the context in which it occurs, and with the particular societal or subcultural membership of the person encoding or decoding the message. A direct gaze, a given interpersonal spatial distance, a touch, may have very different meanings for sender and receiver when communication is cross-cultural.

Communication is necessary for the continuing existence of an individual and his society or subculture. Communication behavior "forms, sustains, mediates, corrects, and interprets relationships (Scheflen, 1964, p. 318)" in groups, signaling individual status and relationship to other members. People must learn communicative patterns of their culture and perform them correctly if they are to thrive, or even survive.

Researchers have found a correlation between eye contact and affect (Goldberg, Kiesler, & Collins, 1969), and between social distance or intimacy and interpersonal spatial distance, angle of orientation, and gaze (Argyle & Dean, 1965).

There is need for basic research on behavior of humans (McGrew, 1969), on proxemics (Hall, 1967), and on concurrent communication modes or infracommunication (Barber and Collins, 1970). Based on the theory and work of anthropologists Hall (1966) and Birdwhistell (1970) and on observations of dyadic interaction, the Dennis Infracommunication Analysis Device (DIAD) (Dennis, 1971) was developed. The instrument was devised to facilitate observation, classification, recording, and analysis of the behavior of single Ss, and infracommunication of Ss interacting dyadically. Coded observations include, when applicable to the situation, data on S sex; race; age and/or status; audible behavior; gaze; position and locomotion; kinesics such as smile, nod, gesture with hand; kinesthetics such as push, hit, hug; interpersonal spatial distance and angle of orientation of Ss in dyadic interaction; and location,

date, and time of observation.

The DIAD may be used with a simple observation technique in natural and laboratory settings; the nonreactive observer refrains from initiating interaction with Ss. As transmissions along infracommunication channels occur and are apparent to the observer at the moment of observation, they are classified and coded. When only one S is observed, observations are made successively. As soon as one observation is made and recorded, another follows in order, to constitute an ethographic segment of a given duration. If only one dyad is observed, observations are sequential, with an observation being made and recorded, and another following immediately afterward.

When data are collected on dyadic nonverbal or nonlinguistic interaction of Ss in a group, a successive scan technique is used with the observer attending the S nearest, and if he is in dyadic interaction with another S, data are recorded; if not, no data are recorded for that S at that time, and observer attention is directed to the S adjacent to or nearest the first. If the second S is interacting with another S, data are recorded, and observer attention is directed to the next S. If not, no data are recorded on S at that time and observer attention is turned to the next S. When all Ss in an area have been attended, observer attention is directed to the first S, and the group is successively scanned for dyadic communication.

The DIAD has been used successfully in a number of studies in laboratories and in natural university, school, and institutional settings. DIAD has been employed in observation of normal, gifted, and retarded pupils; for analysis of classroom interaction, as well as communication out of class in counseling dyads.

Coding Observations

Figure 1 shows DIAD coding of infracommunication of subjects in the following dyad: A white female teacher who is standing, swaying, gesturing with both arms and smiling, is talking in a voice of average loudness, and

gazing at the eyes of a dancing ten year old Black female pupil who is by her side 35 cm. away, singing and watching her movements.

An Example of the Use of the System

It has been found that white children start showing increasing preference for children of their own color from the second grade onward and that Black children begin showing preference for children of their color from the fifth grade onward (Criswell, 1939). One investigation of racial preference and attitude used as Ss Black and white children, who indicated which of two dolls (identical except for color) "looks bad," etc. (Gregor & McPherson, 1966). Another measure of racial attitude and preference of associates may be found in empirical data from systematic observation of nonlexical or nonverbal dyadic behaviors of Black and white children in natural settings. The question may be asked: Do Black and white junior high pupils show less preference for other race companions than do Black and white primary or intermediate pupils?

S_2 sings; audible communication.	S_2 gazes at the body of S_1; gaze.	Side by side; angle of orientation.	S_1 and S_2 are 35 cm. apart; interpersonal spatial distance.	S_2 is a Black female ten year old pupil who is dancing; sex race, status, position and locomotion of S_2.	S_1 is a white female teacher who is standing, swaying; sex, race, status, position and locomotion of S_1.	S_1 looks at the eyes of S_2; gaze.	S_1 speaks in a voice of average loudness; audible communication.	S_1 smiles and gestures with both arms; kinesics.
8	3	4	35	$\underline{8.8}^{10}$	8.0^{30}	1	3	5.1/1

Figure 1. Recorded DIAD Code for a Sample Dyad.

Since interpersonal distance in a dyad is a measure of liking and intimacy (Argyle & Dean, 1965), it is hypothesized that interpersonal spatial distance will be greater in Black-white dyads at the junior high level than at the intermediate or primary levels.

METHOD

Two hundred Ss were observed in a summer school for gifted students, which was composed of 88% white, 9% Black, and 3% other races; 28 Ss in the primary group had completed second grade and were 7-8 years old; 78 Ss in the intermediate group were 9-10 years old; and 85 Ss in the junior high group were 11-14 years old. Observations were made daily, in natural academic settings. Nine hundred ten dyads were observed. One hundred thirty were composed of a white subject interacting with a Black subject (50 were between pupil and teacher, and 80 were composed of pupils). Observer reliability was 90% or higher on all variables, using percent agreement between observers.

RESULTS

The mean interpersonal spatial distance in Black-white dyads composed of interacting pupils was 3.3 cm. ($n = 34$) for the primary group, 6.9 cm. ($n = 26$) for the intermediate group, and 14 cm. ($n = 20$) for the junior high group. A t-test on the data supports the hypothesis ($p < .05$).

Black or white pupils interacted across race with white or Black adult instructors at an interpersonal spatial distance of 6.5 cm. in the primary group ($n = 30$) in the intermediate group ($n = 14$) and at 24.3 cm. in the junior high group ($n = 6$). Due to the small n, significance was not checked.

An interesting finding was that the mean distance of Black male pupils interacting with white classmates was 4.8 cm. ($n = 55$), whereas Black female

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pupils interacted with white classmates at a mean interpersonal spatial distance of 12 cm. (n = 25). In addition, 63% of dyads composed of a Black male pupil interacting with white classmates in the primary group involved touch or contact (14 out of 22), as did 50% of the dyads of primary Black female pupils with white pupils (6 out of 12). Physical contact, or zero distance, occurred in 61% of the dyads (11 out of 18) composed of Black males with white pupils, and in 38% of dyads composed of Black females interacting with white pupils in the intermediate group (3 out of 8). Fifty-three percent of dyads in the junior high group composed of a Black male pupil interacting with white pupils involved contact (8 out of 15); none of the cross-race pupil-pupil dyads with Black female junior high pupils (n = 5) involved physical contact.

CONCLUSION

The Dennis Infracommunication Analysis Device can be used effectively to describe nonverbal communicative behavior and to gather data to test hypotheses. The device yields accurate data that are unobtrusively obtained; in addition, since there are no respondents and no self-reports there is little unknown error. The authors recommend and are conducting further studies relating maturation, attitude, intelligence, race, sex, and other variables from the standpoint of communicative behavior.

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